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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HARNES, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			EXAMINER BRINEY III, WALTER F	
			ART UNIT	PAPER NUMBER
			2646	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/646,541

Applicant(s)

GALLER ET AL.

Examiner

Walter F. Briney III

Art Unit

2646

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☒ Claim(s) 1 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>26 July 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. **Claims 9 and 10 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.**

Claim 9 recites, "the one or more clocks is external to the digital hearing aid."

However claim 7, of which claim 9 depends, recites, "the digital hearing aid...[comprises the] one or more clocks." Clearly a hearing aid cannot comprise one or more clocks external thereto. For the purposes of this action, the "one or more clocks" are assumed to be internal to the hearing aid.

Claim 10 recites, "the one or more timers is external to the digital hearing aid."

However claim 8, of which claim 10 depends, recites, "the digital hearing aid...[comprises the] one or more timers." A hearing aid cannot comprise one or more timers external thereto. For the purposes of this action, the "one or more timers" are assumed to be internal to the hearing aid.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-6, 8, 10, 11, 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shennib et al. (US Patent 6,914,994) in view of Hou (US Patent 6,711,271).**

Claim 1 is limited to “a digital hearing aid for conserving a life of a battery.”

Shennib teaches a canal hearing device with transparent mode. See Abstract. Figure 3 depicts the digital embodiment of Shennib. The hearing includes an input amplifier 52, a DSP 54, an output amplifier 56, and a digital controller 51. With respect to the claims, the input amplifier corresponds to “audio input device,” the DSP corresponds to the “processor,” the output amplifier corresponds to the “audio amplification circuit” and the digital controller corresponds to the “controller.” As seen in figure 3, the digital controller communicates to each of the input amplifier, DSP and output amplifier by way of signal lines 57. See column 3, lines 60-67. For each desired operating mode—which include “ON”, “OFF” and “transparent”—the controller defines the settings for each of the amplifiers and the DSP. See column 3, lines 39-42. This corresponds to “wherein the controller adjusts parameters.” While a user makes a selection using a magnetic switch 42 in the analog embodiment, Shennib is silent as to how the preferred operating mode is selected in the digital embodiment. Therefore, Shennib anticipates all limitations of the claim with the exception wherein “the controller determines a magnitude of the audio signals...[and] adjusts parameters of at least one of the processor and the audio amplification circuit if the magnitude of the audio signals is less than a predetermined threshold for a first period.” However, as will be shown below, this deficiency is overcome by an obvious modification.

In particular, because Shennib is silent as to how to make a mode selection in the digital embodiment, one of ordinary skill in the art would be inherently motivated to

find a teaching of how to select a mode. To that end, Hou teaches power management for hearing aid device. See Abstract. Figure 2 depicts a hearing aid with a microphone 202, signal processing circuitry 206, a speaker 210 and a mode control circuit 212. The microphone corresponds to the microphone 20 of Shennib, the signal processing circuitry 206 corresponds to the circuits 52-56 of Shennib, the speaker corresponds to the speaker 21 of Shennib and the mode control circuit 212 corresponds to the digital controller 51 of Shennib. The mode control provides the ability to select between normal, off and sleep mode. See figure 3. These correspond to the "ON," "OFF," and "transparent" modes of Shennib.

In operation, the mode control circuit 212 receives an incoming sound from the microphone 202 over line 204. The sound is processed in accordance with figure 4. One particular embodiment of the mode controller 410 is shown in figure 6. One particular embodiment of the minimum estimate unit 406 is shown in figure 10. Therein, the input is integrated over an IIR datapath to produce an output that is equivalent to a minimum estimate. See column 8, lines 18-50. In effect, the IIR datapath produces a minimum estimate for a time interval set forth by the integration constant selected by switch circuit 1014. This time interval corresponds to the "first period" as recited. The minimum estimate is then compared to either a first or second minimum signal level by subtract circuit 602 of figure 6 to provide a selection between the normal and sleep modes. See column 6, lines 6-44. With respect to the claim language, because the magnitude is determined over a "first period" according to the circuit of figure 10, the

comparison corresponds to determining “if the magnitude of the audio signals is less than a predetermined threshold for a first period.”

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide intelligent switching between modes as taught by Hou because, at least, Shennib fails to disclose how to select a desired mode in the digital embodiment and because automating a normally manual process (like the one described in connection with the analog embodiment of Shennib) is obvious. See *In re Verner*, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958).

Claim 2 is limited to “the digital hearing aid of claim 1,” as covered by Shennib in view of Hou. Provided that the level of the input sound signal being below one of the minimum signal levels depicted in figure 6 of Hou, the hearing aid described by Shennib in view of Hou will reduce power consumption in accordance with the transparent mode. According to Shennib, the transparent mode generally reduces power consumption by reducing bias currents and reducing gain and bandwidth requirements. See column 4, lines 1-4 and lines 30-41. These measures further define the controller of Shennib as one that “reduces power to at least one of the processor and the audio amplification circuit if the magnitude of the audio signals is less than the predetermined threshold for the first period.” Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 3 is limited to “the digital hearing aid of claim 2,” as covered by Shennib in view of Hou. As illustrated in figure 8 of Hou, if the input sound level received at a microphone exceeds both the first and second minimum signal levels 606 and 608, the

hearing aid resumes normal operation. See column 7, lines 41-52. Resuming normal operation in the context of Shennib means transitioning back to the typical "ON" mode, i.e. restored bias currents and processing. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 4 is limited to "the digital hearing aid of claim 1," as covered by Shennib in view of Hou. As seen in figure 6 of Hou, a comparison between the input signal level and a threshold is made using a subtractor circuit 602 that corresponds to the "comparator" as recited. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 5 is limited to "the digital hearing aid of claim 1," as covered by Shennib in view of Hou. Shennib discloses an analog-to-digital converter 53 and digital-to-analog converter 55 that correspond directly to the converters of the claim. As seen in figure 3, they are arranged about the DSP 54 as recited. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 6 is limited to "the digital hearing aid of claim 5," as covered by Shennib in view of Hou. While the details of the power controller are not expressly shown, the power controller corresponds to the "switching circuits that control power to at least one of the processor, the analog-to-digital converter, the digital-to analog converter and the audio amplification circuit." As stated in column 4, lines 1-4, the controller 51 controls the power controller to affect the bias currents, which corresponds to switching.

Claim 8 is limited to "the digital hearing aid of claim 1," as covered by Shennib in view of Hou. The integrating time constant alpha, as shown in figure 10 of Hou,

determines the "first period." In this way it corresponds to the "one or more timers."

Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 10 is limited to "the digital hearing aid of claim 8," as covered by Shennib in view of Hou. According to the claim objection in the preceding section, this claim does not further limit the parent. As such, it is rejected for the same reasons as claim 8.

Claim 11 is limited to "the digital hearing aid of claim 1," as covered by Shennib in view of Hou. Shennib discloses wires 57 for configuring settings of all elements. The wires correspond to the "interface" as recited. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 13 is limited to "the digital hearing aid of claim 1," as covered by Shennib in view of Hou. The minimum estimate unit depicted in figure 10 of Hou corresponds to an "integrator" as recited. As apparently defined on page 4, line 19, through page 5, line 4, of the applicant's specification, the term "logic signal" does not mean a logical "1" or "0" as generally accepted, but rather means an average signal. As the minimum estimate is essentially an average over the time period defined by alpha, its output corresponds to the "logic signal" as recited. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 14 is limited to "the digital hearing aid of claim 1," as covered by Shennib in view of Hou. Although not shown, digital systems inherently include clocks. The clock that inherently feeds the digital controller 51 of Shennib controls the operation of the digital controller, which controls the power supplied to the digital datapath of

Shennib. In this way, said clock determines power delivery to the DSP 54. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 15 is limited to “the digital hearing aid of claim 1,” as covered by Shennib in view of Hou. Shennib discloses that the DSP 54 uses one of at least two programs known as an ON program 61 and a transparent program 62. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 16 is limited to “the digital hearing aid of claim 1,” as covered by Shennib in view of Hou. Apropos the rejection of claim 1, it was shown that the transparent program of Shennib is selected in response to an input sound level falling below one of the thresholds depicted in figure 6 of Hou. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 17 is limited to “a method for conserving a life of a battery in a digital hearing aid.” The method of claim 17 is inherently performed by the digital hearing aid of claim 3, as covered by Shennib in view of Hou. Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 18 is limited to “the method of claim 17,” as covered by Shennib in view of Hou. Hou does not teach any type of adaptive means for setting alpha, such that, alpha must be “preset.” Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

Claim 19 is limited to “the method of claim 17,” as covered by Shennib in view of Hou. The minimum estimate unit depicted in figure 10 of Hou corresponds to the “timer”

as recited as it measures out the “first period” defined by the time constant alpha.

Therefore, Shennib in view of Hou makes obvious all limitations of the claim.

3. **Claims 7, 9, 12, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shennib in view of Hou and further in view of Schulz et al. (US Patent 6,516,073).**

Claim 7 is limited to “the digital hearing aid of claim 6,” as covered by Shennib in view of Hou. Although Shennib appears to disclose using a digital program that reduces processing, there is no explicit disclosure as to how this program reduces power consumption. Therefore, Shennib anticipates all limitations of the claim with the exception of one or more clocks that determine functions of at least one of the processor...wherein the controller adjusts the power by adjusting at least one of the one or more clocks.” However, as will be shown below this deficiency is overcome by an obvious modification.

In particular, Schulz teaches a self-powered medical device. See Abstract. The aim of Schulz is to prolong battery life by reducing the sampling rate of all digital components. To this end, controller 7 adjusts the frequency of a clock generated by a clock generator 12. Schulz teaches that the ability to select a particular clock frequency is useful for hearing aids that use different programs, such as the normal mode and the transparent mode disclosed by Shennib. See column 2, lines 29-39. Given that typical hearing aids operate up to 10 KHz (Schulz column 2, lines 46-48), when the transparent mode of Shennib is selected for use, an appropriately reduced sampling rate will be used for operation up to 4 KHz (Shennib column 4, lines 33-36), reducing power consumption.

It would have been obvious to one of ordinary skill in the art at the time of the invention to reduce a sampling rate of all digital components of a hearing aid as taught by Schulz for the purpose of reducing the amount of samples taken to a minimum for a particular audio program, which directly reduces power consumption.

Claim 9 is limited to “the digital hearing aid of claim 7,” as covered by Shennib in view of Hou. According to the claim objection in the preceding section, this claim does not further limit the parent. As such, it is rejected for the same reasons as claim 7.

Claim 12 is limited to “the digital hearing aid of claim 5,” as covered by Shennib in view of Hou. Apropos the rejection of claim 7, it is noted that neither Shennib nor Hou teach adjusting a sampling rate, however, it would have been obvious to one of ordinary skill in the art to do so in view of the teachings of Schulz. Therefore, Shennib in view of Hou and further in view of Schulz makes obvious all limitations of the claim.

Claim 20 is limited to “the method of claim 17,” as covered by Shennib in view of Hou. Apropos the rejection of claim 7 it was shown that neither Shennib nor Hou teach adjusting power consumption by adjusting a clock of a hearing aid, however, it would have been obvious to do so in view of Schulz. Therefore, Shennib in view of Hou and further in view of Schulz makes obvious all limitations of the claim.

Claim 21 is limited to “the method of claim 17,” as covered by Shennib in view of Hou. Apropos the rejection of claim 7 it was shown that neither Shennib nor Hou teach adjusting power consumption by adjusting a clock of a hearing aid, however, it would have been obvious to do so in view of Schulz. Therefore, Shennib in view of Hou and further in view of Schulz makes obvious all limitations of the claim.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F. Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WFB



**SINH TRAN
SUPERVISORY PATENT EXAMINER**